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D. Lawrence
#8
10-31-02

PATENT

Customer No. 22,852
Attorney Docket No. 07648-0002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
JIAN LI ET AL.) Group Art Unit: 1743
Application No.: 09/513,207) Examiner: Arlen Soderquist
Filed: February 24, 2000)
For: SIMULTANEOUS AND RAPID)
DETERMINATION OF MULTIPLE)
COMPONENT)
CONCENTRATIONS IN A MULTI-)
COMPONENT CHEMICAL)
PROCESS STREAM)

RECEIVED
OCT 24 2002
TC 1700

Commissioner for Patents
Washington, DC 20231

Sir:

DECLARATION UNDER 37 C.F.R. § 1.132

I, Xin Sheng Chai, do hereby make the following declaration:

1. I am one of the co-inventors of the invention claimed in the present patent application.
2. I received my PhD from the Royal Institute of Technology in Stockholm Sweden.
3. My work over the last ten years has been focused on pulp and paper technology.
4. I have reviewed this application and the outstanding Office Action dated April 15, 2002.

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5. I am the co-author together with Lars-Goran Danielsson of the paper entitled "Spectroscopic Measurements in Opaque Solutions: UV-VIS spectroscopy on process liquors in the paper and pulp industries" published in *Process Control and Quality*, 6, 149-157, 1994, which is the primary reference cited in the outstanding Office Action. Significant differences exist between the present application and my previous work (together with Danielsson). Danielsson and I were never able to separately determine two key components from a kraft process liquor stream, hydroxide and carbonate.

One difference between the work that lead up to the filing of the present patent application and my previous work (together with Danielsson) is that the structure used in the current work is able to measure spectral absorption below 210 nm. This improvement makes possible the determination of both hydroxide and carbonate, even when found together with sulfide.

In my previous work, Danielsson and I used an optical fiber for light transmission from the light source to the ATR probe and to the detector of the spectrometer. It is well known that most fiber optics have very poor light transmission efficiency in the far UV range. The structure proposed by Danielsson and I was not capable of detecting the absorption of carbonate and hydroxide in the wavelength range below 210 nm. Therefore, my previous work (with Danielsson) could only determine the sulfide and the "total salts" as mentioned in the paper. The "total salts" has no practical meaning for the pulp and paper industry since does not provide any information about the compositions of the species.

6. The structure described in the present application uses air or new fiber technology to transmit light to the ATR probe and to the detector of the spectrometer,

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therefore, we were able to obtain absorption signal in the far UV range, i.e., below 210 nm, for the determination of concentrations of carbonate and hydroxide in kraft liquors.

With the fiber-optic structure used in my previous work (with Danielsson), it is impossible to achieve the simultaneous determination of sulfide, hydroxide and carbonate in a kraft process liquor. The UV spectral range in Figure 5 of my previous paper (with Danielsson) was actually from 210 - 360 nm rather than 190 - 380 nm as mentioned twice in the outstanding Office Action. The figure used a wavelength scale range from 190 - 380 nm, however there was no data in the far UV range, i.e., below 210 nm.

7. The present invention can provide a rapid simultaneously determination of sulfide, hydroxide and carbonate in a process liquor without changing the composition of the liquor (i.e., no dilution) using only a single sensor device (i.e., ATR).

The technique that Holmquist used could only determine sulfide in the kraft liquor by UV. Furthermore, sample dilution was required in Holmquist's invention, a key limitation that is not necessary when using the structure of the present invention.

Solomon must use a special chromate electrolyte solution in his system, thus, changes in sample composition and sample dilution can not be avoided. Furthermore, using the technique described in Solomon one cannot achieve a rapid simultaneously measurement for these three required components, i.e., it will take 1.5 minutes to obtain the signal for hydroxide, 3.5 minutes for hydrogen sulfide and 4.8 minutes for carbonate as shown in the Fig. 7 of Solomon. The method of Solomon only provides qualitative information and is not used for quantification of the components.

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8. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: 10/10/2002

By: Xin Sheng Chai
XIN SHENG CHAI